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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,630	03/06/2002	I-Chao Chung	tba	9132

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EXAMINER

JULES, FRANTZ F

ART UNIT	PAPER NUMBER
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3617

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/091,630

Applicant(s)

CHUNG, I-CHAO

Examiner

Frantz F. Jules

Art Unit

3617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6-15 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 16 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 9-11, 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ash (US 1,979,598).

Claims 1-3, 9-11, 13-14

Ash teaches all the limitations of claims 1-3, 9-11, 13-14 by showing in fig. 3 a wheel end assembly comprising a spindle (2) defining an axis of rotation, a first wheel hub (5) supported on said spindle by at least one first bearing (7), a second wheel hub (6) supported on said spindle (2) adjacent to said first wheel hub (5) by at least a second bearing member (7A) for rotation about said axis; and at least one third bearing member (14) mounted between the first and second wheel hubs to permit said first and second wheel hubs (5, 6) to rotate independently from each other.

A fastener (2A) is mounted on one end of the spindle (2) to prevent linear movement of the first and second wheel hubs (5, 6) to rotate independently from each other in accordance with claim 2.

The at least one first bearing member (7) is a single bearing and said at least one second bearing member (7A) is a single bearing in accordance with claim 3.

Art Unit: 3617

The at least one third bearing (14) is solely supported between the first and second wheel hub (5, 6) to permit the first and second wheel hubs (5, 6) to rotate independently from each other under predetermined conditions in accordance with claims 9, 13-14.

Said at least one third bearing member (14) is a radial four point contact ball bearing and also a double-row angular-contact ball bearing in accordance with claims 10-11.

3. Claims 1-3, 9, 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Higbee (US 1,809,699).

Claims 1-3, 9, 13-15

Higbee teaches all the limitations of claims 1-3, 9, 13-15 by showing in fig. 1 a wheel end assembly comprising a spindle (60) defining an axis of rotation, a first wheel hub (22) supported on said spindle by at least one first bearing (16), a second wheel hub (18) supported on said spindle (60) adjacent to said first wheel hub (22) by at least a second bearing member (14) for rotation about said axis; and at least one third bearing member (24) mounted between the first and second wheel hubs to permit said first and second wheel hubs (22, 18) to rotate independently from each other.

A fastener (36) is mounted on one end of the spindle (60) to prevent linear movement of the first and second wheel hubs (22, 18) to rotate independently from each other in accordance with claim 2.

The at least one first bearing member (16) is a single bearing and said at least one second bearing member (14) is a single bearing in accordance with claim 3.

The at least one third bearing (24) is solely supported between the first and second wheel hub (22, 18) to permit the first and second wheel hubs (22, 18) to rotate

Art Unit: 3617

independently from each other under predetermined conditions in accordance with claims 9, 13-14.

Said third bearing member (24) is located at a greater radial from said axis than the first or second bearing members (16, 14).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ash as applied to claim 1.

**Claim 12**

Regarding using a double-row taper roller bearing as recited in claim 12, It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ash to include the use of a double-row taper roller bearing in his advantageous system, as bearing selection is a common and everyday occurrence throughout the wheel assembly design art and the specific use of a double-row taper roller bearing would have been an obvious matter of design preference depending upon such factors as the amount of axial loading imposed on the bearing, the yield strength of the bearing material, the operating speed of the wheel and bearing assembly; the ordinarily skilled artisan choosing the best stress profile corresponding to a particular loading imposed on the bearing which would most optimize the cost and performance of the device for a

Art Unit: 3617

particular application at hand, based upon the above noted common design criteria.

6. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higbee in view of Kallenberger (US 5,290,069).

#### Claims 6-7

Higbee teaches all the limitations of claims 6-7 except for a wheel end assembly having a third bearing member constituted by a bushing made of bronze which can support bi-directional axial and radial loads. The general concept of using a bearing member constituted by a bushing made of bronze which can support bi-directional axial and radial loads in a drive shaft spindle assembly is well known in the art as illustrated by Kallenberger which discloses in figs. 2-10 a bearing member (110) constituted by a bushing made of bronze which can support bi-directional axial and radial loads, see column 1, lines 16-31. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Higbee to include the use of a bushing member constituted by a bushing made of bronze which can support bi-directional axial and radial loads in his advantageous wheel end assembly as taught by Kallenberger in order to reduce the amount of loading imposed on the first and second bearings during cyclic loading due to impact.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higbee and Kallenberger as applied to claims 1, and 6 above, and further in view of El-Kassouf (US 5,971,413).

#### Claim 8

Art Unit: 3617

Higbee and Kallenberger teach all the limitations of claim 8 except for a wheel end assembly having a third bearing member constituted by a bushing which is a nylon-coated steel bushing. The general concept of applying a nylon coat to an outer surface of a steel bushing in a drive shaft spindle assembly is well known in the art as illustrated by El-Kassouf which discloses in figs. 2-3 a bearing member constituted by a bushing (46) made of steel which includes nylon coating (92) on its exterior surface, see column 4, lines 30-36. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Higbee to include the use of a bushing made of steel which include a nylon coating on its outside surface in his advantageous wheel end assembly as taught by El-Kassouf in order to reduce heat generated due to friction in the bearing thereby increasing the service life of the bearing.

***Allowable Subject Matter***

Claims 4-5, 16-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the references of record suggests a wheel end assembly comprising a spindle defining an axis of rotation, a first wheel hub supported on said spindle by at least one first bearing, a second wheel hub supported on said spindle adjacent to said first wheel hub by at least a second bearing member for rotation about said axis; and at least one third bearing member mounted between the first and second wheel hubs to permit said first and second wheel hubs to rotate independently from each other, wherein a third wheel hub is positioned on an opposite side of the second wheel hub from the first wheel hub for rotation about said axis and

Art Unit: 3617

including at least one fourth bearing member for allowing the third and second wheel hubs to rotate independently from each other with said third bearing member mounted between the first and second wheel hubs and said fourth bearing member mounted between the second and third wheel hubs in the manner defined in the instant claims 4, and 16. Therefore, claims 5, and 17, depending therefrom are considered to be objected.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Marsh is cited to show a related wheel end assembly having first and second bearings supporting first and second wheel hubs and an intermediate bearing.

Lewis, Tolman, and Altemus are cited to show related wheel end assembly having four point contact, and tapered roller bearing.

Nakano et al, and Gulian et al are cited to show related bearing bushing capable of carrying load in both axial direction.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frantz F. Jules whose telephone number is (703) 308-8780. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Morano can be reached on (703) 308-0230. The fax phone numbers for the organization where this application or proceeding is assigned are (703)



Art Unit: 3617

305-7687 for regular communications and (703) 305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

Frantz F. Jules  
Examiner  
Art Unit 3617

FFJ

April 4, 2003

**FRANTZ F. JULES**  
**PATENT EXAMINER**

A handwritten signature in black ink, appearing to read 'Frantz', with a stylized flourish extending to the right.